

Abstract

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Parallelizing Optimal Multiple Sequence Alignment by Dynamic Programming.

Optimal multiple sequence alignment by dynamic programming, like many highly dimensional scientific computing problems, has failed to benefit from the improvements in computing performance brought about by multi-processor systems, due to the lack of suitable scheme to manage partitioning and dependencies. A scheme for parallel implementation of the dynamic programming multiple sequence alignment is presented, based on a peer to peer design and a multidimensional array indexing method. This design results in up to 5-fold improvement compared to a previously described master/slave design, and scales favourably with the number of processors used. This study demonstrates an approach for parallelising multi-dimensional dynamic programming and similar algorithms utilizing multi-processor architectures.